



**Harper Adams
University**

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Animal Science Research Centre – Beef Unit Trial Results – 2018 (d)

**Evaluation of suckler-bred progeny sired by Hereford bulls with either top 35%
or top 60% Terminal Indexes**

Introduction and Objective:

Previous studies at Harper Adams University with progeny from Limousin, Angus and Simmental bulls with different Beef Values/Terminal Indexes have shown significant improvements in performance with calves sired by the higher index bulls (Marsh and Pullar, 2002; Marsh *et al.*, 2007; Marsh *et al.*, 2008; Marsh 2012, 2016, 2017 & 2018). To expand the database to confirm that EBV's 'work' a further study with Hereford sires was carried out on a commercial suckled-calf unit. The objective of this 8th study using Hereford bulls was to compare the performance of progeny from top 35% and top 60% Terminal Index sires with calves finished on a 19-22-month semi-intensive system.

Animals & Timing:

Calf performance was collated from Mark Spendlove's commercial spring-calving suckler herd at Hill Farm in Northamptonshire. The performance of progeny from two Hereford bulls that were mated to British Blue x Holstein-Friesian cows with calves born in the spring of 2014 and 2015 was statistically analysed with calves finished at 19-22 months of age in 2016 and 2017.

Comparison:

The following Hereford bulls were chosen for evaluation:

Bull A (Terminal Sire Index +27 – Top 35%)

Bull B (Terminal Sire Index +23 – Top 60%)

Bull A has excellent 200, 400 and 600 Day Weight (kgs) EBV's that fall within the top 10% of the breed. His carcass traits are equally impressive, with both Eye Muscle Area (sq mm) and Intramuscular Fat (%) ranking in the top 5%, scoring +3.7 and +0.4 respectively. However, his calving figures are predominantly negative with Calving Ease Direct (%) EBV in the bottom 10% of breed with a value of -5.0, whilst Birth Weight (kgs) measured +3.8 (bottom 15%). Bull A was purchased based on EBV's alone with no visual assessment prior to purchase. See appendix 1 for full EBV details.

In contrast, Bull B has notably poorer EBV's, for growth and carcass traits in particular. His 200 Day Weight is below the breed average at +24kg, falling within the bottom 35% of the Hereford breed. Rib Fat (mm), Retail Yield (%) and IMF are again, all within the bottom 30%, whilst only Eye Muscle Area shows a marginally positive value of +2.0 (Top 50%). Despite this, his calving values are positive, with Calving Ease Direct measuring +1.8 (Top 30%) and

Birth Weight at +1.2 (Top 20%). Bull B was purchased predominantly on phenotypic appraisal, having been a successful show winner throughout the 2012 season.

Herd Management:

The suckler herd comprises of 125 British Blue x Holstein-Friesian suckler cows, producing 120 finished cattle annually on a semi-intensive system. Approximately 20 British Blue x Holstein-Friesian heifer calves are purchased each Autumn and bucket reared for 12 weeks. These are bred to Hereford bulls at 15 months, aiming to calve at 24 months old. Calving takes place indoors over 12-weeks from March to May to coincide with increasing spring grass growth at turnout. Cows and calves are grazed on permanent pasture during the summer months, with calves offered an 18% CP creep feed *ad-lib* from early September until housing (80kg/calf). Calves are weaned and housed in late October, receiving no health treatments. Winter nutrition for the cows is based on a grass-silage and straw whilst calves are fed a growing ration based on grass silage, rape meal and brewer's grains. The following summer, calves are set-stocked on pasture before being housed in September. Calves are split by sex and fed a 16% CP (in DM) finishing diet that is based on grass clover silage, barley straw, sweet starch, rapeseed and minerals. During the finishing period, the feed ration costs £1.72/day for steers and £1.61/day for heifers. Details of the grower and finisher diets are shown in appendix 2. Cattle are finished at 19-22 months of age and slaughtered at Dovecote Park to supply the Waitrose Hereford beef scheme.



Figure above left. Blue x Holstein suckler cows with Hereford calves at Mark Spendlove's Hill Farm in Northamptonshire.

Figure above right. Matthew Rollason (left) and Mark Spendlove (right).



Figure above left. Mark Spendlove's 15-month-old Hereford x Blue/Holstein steers.

Figure above right. 15-month-old Hereford x Blue/Holstein heifers.

Results:

Table 1. Slaughter performance and carcass grades

	Sire A (Top 35%)		Sire B (Top 60%)	
	Steers	Heifers	Steers	Heifers
Age at slaughter (days)	640 (21 mo)	592 (19.4 mo)	677 (22.2 mo)	617 (20.2 mo)
Carcass weight (kg)	380	305	373	297
Daily carcass gain from birth (kg)	0.59	0.52	0.55	0.48
Conformation classification (1-15)	7.33	6.49	7.53	6.50
Fat classification (1-15)	10.50	10.82	10.93	10.25
Carcass price (£/kg) – March 2018	3.82	3.82	3.78	3.84
Carcass value (£)	1451.45	1166.35	1405.39	1139.31

EUROP carcass classification: Conformation P- =1 and E+ = 15, Fat: 1- = 1 and 5+ = 15.

Carcass price standardised to a base price of £3.90/kg. Includes penalties for under and over weights.

Table 2. Effect of Sire TSI on progeny performance and carcass characteristics (steers and heifers)

	Sire A (Top 35%)	Sire B (Top 60%)	s.e.d	Sig
Age at slaughter (days)	616 (20.2 mo)	647 (21.2 mo)	42.76	*
Carcass weight (kg)	342.5	335.0	29.18	NS
Daily carcass gain from birth (kg)	0.56	0.52	0.48	**
Conformation classification (1-15)	6.91 (R-)	7.02 (R-)	0.89	NS
Fat classification (1-15)	10.65 (4-/4=)	10.59 (4-/4=)	0.80	NS
Carcass price (£/kg) – March 2018	3.82	3.82	0.12	NS
Carcass value (£)	1,308.35	1,279.70	167.4	NS

NS = not significant, * = P<0.05, ** = P<0.01, *** = P<0.001

Discussion and Conclusions:

- Overall performance of the Hereford-bred calves was excellent, exceeding the recognised targets for semi-intensive finishing suckled calves at 22 months old. The target for a continental-bred steer is a 390kg carcass. This carcass weight was virtually achieved with the Top 35% index native-bred steers at only 21 months of age without potentially greater calving issues inherent with a continental breed versus a native. In addition, it is recognised that subsequent cow fertility is also improved with easier calving bulls.
- Calving ease and the percentage of calves reared was similar for both bulls. Many factors influence calving ease, particularly cow body condition score. The Hereford of course is noted as being an easy calving breed.
- The calves sired by the Top 35% index bull recorded significantly higher daily carcass gains which mirrored the growth EBV's for the bulls.
- Of more significance is calves by the Top 35% index sire were finished 31 days earlier. The steers finished 37 days earlier and based on a finishing cost of £1.72/day this was worth £63.64/calf. Heifers finished 25 days earlier and with a finishing cost of £1.61/day this was worth £40.25/calf. Mean average of steers and heifers would be £51.95/calf.
- The calves sired by the Top 35% index bull recorded higher carcass weights (+7.5kg) which were worth some £28.65 more per calf.
- Reduced feed costs and increased carcass weights was worth £80.60 per calf from the Top 35% sire which is significantly higher than the predicted £2 per calf from the TSI!
- The Top 60% bull was purchased predominantly on phenotypic appraisal, having been a successful show winner throughout the 2012 season. The Top 35% bull was purchased predominantly on his Index and illustrates that in this study 'show winners' do not necessarily produce more profitable calves.
- As expected, the performance of steers was significantly better with carcasses some 75kg

heavier worth some £266-285 more. Heifers were however finished 48-60 days earlier which would reduce feed costs by £80-100 per head on this system, even before considering further variable and fixed cost reductions.

- This is now the 8th study carried out by Harper Adams to compare the performance of progeny from bulls with different Terminal Indexes. All eight studies have shown that with high Index bulls, with reasonably high levels of EBV accuracy, produce calves with significantly superior physical and economic performance to those from low Index bulls.

Acknowledgement:

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Appendix 1

Hereford bull EBV's – March 2018 BLUP

EBV trait	Bull A (Top 35%)			Bull B (Top 60%)			Hereford Breed Avg. EBVs for 2016 born calves
	EBV value	Accuracy (%)	Percentile band	EBV value	Accuracy (%)	Percentile band	
Calving Ease DIR (%)	-5.0	42	Top 90%	+1.8	47	Top 30%	-0.4
Calving Ease DTRS (%)	-2.5	42	Top 75%	+1.0	46	Top 25%	-0.8
Birth Wt. (kg)	+3.8	58	Top 85%	+1.2	72	Top 15%	+2.3
200 Day Wt. (kg)	+34	63	Top 15%	+24	65	Top 65%	+26
400 Day Wt. (kg)	+65	64	Top 10%	+48	64	Top 55%	+48
600 Day Wt. (kg)	+83	60	Top 10%	+57	63	Top 60%	+61
200 Day Milk (kg)	+5	52	Top 50%	+5	53	Top 50%	+5
Scrotal Size (cm)	+2.6	71	Top 1%	-0.1	73	Top 95%	+0.6
Eye Muscle Area (sq cm)	+3.7	47	Top 5%	+2.0	43	Top 45%	+1.9
Rib Fat (mm)	+2.0	51	Top 99%	+0.1	47	Top 70%	-0.1
Retail Beef Yield (%)	-0.8	49	Top 99%	+0.2	45	Top 65%	+0.4
IMF (%)	+0.4	50	Top 5%	-0.2	44	Top 70%	-0.1
Terminal Sire Index	+27		Top 35%	23		Top 60%	+24
Self Replacing Index	+35		Top 25%	29		Top 55%	+29

Note: Positive Fat Depth EBV is important for bulls used to breed finished cattle with adequate fat cover.

Appendix 2 Grower and finishing diets

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Mark
Spendlove

DietCheck Beef Multiple report

Diet name:	Finishers 12.09.16	Growers 12.09.16
Animal details		
Weight (kg)	500	350
Maturity rate	Medium	Medium
Growth rate (kg/d)	1.50	1.00
Sex	Castrates	Heifers
Diet cost (£/d)	1.72	0.77
Feeding plan (kg as fed/head/d)		
Grass Clover Silage	-	20.000
Wholecrop Mixed	12.000	-
Straw -Barley	0.500	0.500
Sweet Starch	8.000	1.500
Rapeseed -extracted	1.650	0.250
Beef mineral	0.080	0.080
Nutrients		
DM intake (kg/d)	12.1	8.0
Forage DM (kg)	3.5	6.4
ME (M/D)	12.5	10.9
FME (MJ)	106	60
Protein (%DM)	16.0	16.2
Starch (%DM)	27.7	6.6
Sugar (%DM)	6	6
NDF (%DM)	22.5	40.2
Oil (AH) (%DM)	10	6
Ash (%DM)	15	12
Calcium (%DM)	0.5	0.7
Phosphorus (%DM)	0.7	0.5
Magnesium (%DM)	0.2	0.2

(Source: Spendlove Bros. 2018)